MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2016/2017

PBM0045 – MATHEMATICS

(Foundation in Management / Foundation in Business)

26 May 2017
3.00 p.m. – 5.00 p.m.
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of 2 pages with **FIVE** questions.
2. Attempt **ALL** five questions. The distribution of the marks for each question is given.
3. Please write all your answers in the answer booklet provided. All necessary workings **MUST** be shown.

Question 1

a. Factor : $(m+4)^3 - 9m - 36$. (4 marks)

b. Solve : $\frac{1}{2} - \left(2x - \frac{1}{2}(x-3) + \frac{x}{2}\right)2 < 0$. (4 marks)

c. Solve: $\sqrt{2y+9} = \sqrt{y+1} + \sqrt{y+4}$. (8 marks)

d. Determine the domain of each function:

i. $g(x) = \frac{2x+1}{3x^3 - 2x^2 - 12x + 8}$ (4 marks)

ii. $f(x) = \frac{\sqrt{15x^2 + 7x - 2}}{4x - 1}$ (5 marks)

(Total = 25 marks)

Question 2

a. The fifth term and the twelfth term of a geometric progression are $\frac{5}{4}$ and 160 respectively. Find the 28^{th} term of the geometric progression. (6 marks)

b. Given the arithmetic progression: $1, 4, 7, ..., x, ...$

i. If x is the nth term, show that $x = 3n - 2$. (3 marks)

ii. Find the sum of the first n terms if n is 25. (3 marks)

(Total = 12 marks)

Question 3

Solve the following system of linear equations using the inverse of coefficient matrix.

$$5x - 6y - 7z - 7 = 0$$
$$6x - 4y + 10z + 34 = 0$$
$$2x + 4y - 3z - 29 = 0$$

(13 marks)

(Total = 13 marks)

Continued...

Question 4

a. Find $f'(x)$ for the given functions and simplify the answers.

i. $f(x) = -\frac{11}{9}x^{\frac{13}{7}} + \frac{12}{25}x^{10} - 100\sqrt[3]{x^2} + \frac{24}{x^{\frac{4}{5}}}$ (4 marks)

ii. $f(x) = -3x^2\left(4x^2 + 7\right)^3$ (6 marks)

iii. $f(x) = \frac{x^2 + 5x}{\left(3x^4 + 1\right)^3}$ (6 marks)

b. Consider the function $y = 3u^4 - 4u + 5$, where $u = x^3 - 2x - 5$.

i. Use the chain rule to find $\frac{dy}{dx}$ when $x = 2$. (6 marks)

ii. Find the equation for the tangent line to the graph of $y(x)$ at $x = 2$. (3 marks)

(Total = 25 marks)

Question 5

Evaluate the following integrals.

a. $\int 8x^{-\frac{1}{4}}\left(x - \frac{1}{3x^3}\right) - \left(\frac{\sqrt{x} + 1}{\sqrt[5]{x^2}}\right) dx$ (5 marks)

b. $\int_0^4 9x^{\frac{1}{2}}\sqrt{x^{\frac{3}{2}} + 1}\ dx$ (7 marks)

c. $\int \frac{18x^2 - 24x + 6}{\left(x^3 - 2x^2 + x + 12\right)^5} dx$ (5 marks)

d. A manufacturer has found that marginal cost, $\frac{dC}{dq} = 3q^2 - 60q + 400$ Ringgit per unit when q units have been produced. The total cost, $C(q)$ of producing the first 2 units is RM900. What is the total cost of producing the first 8 units? (8 marks)

(Total = 25 marks)

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